

COMMUNICATIONS INC.

SERVICE MANUAL

NOISE BLANKER

MODEL MA-176

SERVICE INSTRUCTIONS

MA-176

NOISE BLANKER

A. GENERAL DESCRIPTION

The Regency MA-176 option is a special accessory to be used only with the Regency MICRO-COM L60 Series transceivers where excessive ignition noise is a problem in mobile installations. It is available factory installed or as a kit and is compatible with all other Regency options.

A Block Diagram is shown in Figure 1, a Schematic in Figure 2 and a Parts Placement diagram in Figure 3.

B. CIRCUIT DESCRIPTION (Refer to Figures 1 and 2)

Impulse noise appearing at the receiver RF input is mixed with the incoming signal in the front end and propagated through the I.F.s resulting in annoying pops at the receiver audio output. The MA-176 noise blanker is designed to detect the noise at the RF input and stop it at the front end output before it enters the I.F.s and the rest of the radio.

The noise blanker's RF amp (Q703) is paralleled with the RF input but tuned to 21 MHz so that it's effect on the front end tuning is negligible. This is possible since impulse noise by nature consists of all frequencies.

The RF amplifier output is then buffered and fed into a one-shot multivibrator (Q702, Q704). This creates a pulse which switches Q205 on and shorts out the I.F. for the duration of the pulse.

The pulse output of the one-shot is also stretched and used as bias for the AGC transistor (Q701). Should the pulse rate become excessively high, Q701 will turn on and lower the bias of the buffer. This is to keep the receiver from losing all sensitivity should a stray signal appear at 21 MHz and cause excessive pulsing.

C. INSTALLATION AND TUNE-UP (Refer to Figure 4)

1. Attach the MA-176 board to the chassis as shown using the screws supplied.
2. Connect JO701 from P1 on the MA-176 to the P1 on the radio. Connect JO702 from F1 and G on the MA 176 board to F1 on the radio. Connect JO703 from K6 and G on the MA-176 board to K6 and G on the radio board. If desired the P1 line may be routed through one of the option switches so that the blanker can be turned off by the operator.
3. Tune the receiver per it's tune-up instructions. Note that discriminator tuning has a great effect on noise and L209 may be given a final tweek in it's installation to minimize noise.
4. With the radio on, apply a +10 dbm signal at 21 MHz to the receiver input. Observe K6 with an oscilloscope. Pulses approximately .7V in magnitude should be observable. Reduce the signal generator level until the unit barely pulses. Adjust L701, L702 and L703 until pulse

repetition rate is maximized. (Note that a DC baseline exists which peaks with maximum pulse rate. This may be a clearer indication of tuning.) Repeat this process until maximum sensitivity is realized.

5. Recheck receiver tuning.

D. TROUBLESHOOTING TIPS

1. RF Amp: Base voltage should be about one-fifth collector voltage (approximately 2 to 2.5v). Voltage drop across R707 should be about three times the drop across R711 or about 1.5 volts.

2. Buffer: Base voltage should be about one-third collector voltage or approximately 4 volts. Emitter voltage should be at least 3 volts. These voltages are taken with 50 Ω across the antenna terminals but no signal input. Should the buffer base and emitter voltages be low, check to see if the AGC transistor is turned on. This may be done by shorting the base of Q701 to ground and noting a rise in Q705 voltages to the proper values.

3. AGC Transistor: Under properly loaded, no signal input conditions to the receiver, the base of Q701 should be 0 volts. If this is not the case and the buffer has been turned off as described in (2), check K6 for pulses. If K6 is not pulsing, troubleshoot the one-shot circuit. If pulses appear at K6, the unit is oscillating and retuning to a slightly different frequency should solve this problem.

4. One-Shot: Voltages here are the most critical in the MA-176. With no signal input and 50 Ω on the receiver input voltages must be as follows: The collector of Q702 must be 0 volts. CR702 is forward biased and must have a voltage drop less than .4 volts (.2 -.3 volts is typical). Voltage drop from emitter to collector of Q704 must be greater than .2 volts but less than .5 volts. Voltages different than those described may be attributed to CR702 or Q704.

5. General Installation Notes: Noise has always been a problem in mobile radio installations, but since no two vehicles have the same source or level of generated noise, no set rules can be established for noise suppression. Eliminating noise at the source will help control the interference. Table 1 identifies the different sources of interference and suggests the corrective measures that may be employed by the service technician. The ignition system is the major source of noise. Other sources are the generator, voltage regulator, instruments and the build-up of static electricity on various moving parts. Refer to Figure 5.

The three basic methods of noise suppression are:

A. Arc Suppression

Electromagnetic waves are radiated from the ignition system each time a spark plug fires. This radiation may be reduced by suppressing, or reducing, the amount of current flow during the firing period by installing resistive type spark plugs and ignition wires. Clean and properly adjusted spark plugs and breaker points also minimize this radiation.

Modern ignition systems (capacitive discharge, breakerless, etc.) have higher levels of radiation but are spectrally cleaner than earlier types. In certain medium signal conditions with a system of this type, the effects of the MA-176 may be minimal or slightly degrading. Use of an on-off switch for the MA-176 is recommended in these installations.

B. Filtering

Filtering reduces the noises transmitted to the mobile receiver through the wiring. There are several types of noise filters available but the most common and usually the most effective are the "by-pass" and the "feed-thru" coaxial type capacitors. The capacitors should be mounted as near the source of interference as possible.

C. Shielding

Shielding reduces electromagnetic interference by enclosing the noise source within a shielded area. Shielding kits are available and recommended if the vehicle has none.

E. SPECIFICATIONS

	<u>Guaranteed</u>	<u>Typical</u>
Operating frequency	21 MHz	-
Sensitivity	800 μ v (max)	500 μ v
Blanker pulse width	-	5 μ s
Blanking pulse rise time	-	.02 μ s
Maximum pulse repetition rate	-	20 KHz
Receiver sinad degradation	6 db (max)	3 db
Receiver quieting degradation	6 db (max)	3 db

F. PARTS LIST

<u>Reference Designation</u>	<u>Description</u>	<u>Part Number</u>
<u>RESISTORS</u> (All resistors are $\frac{1}{4}$ watt 5% unless otherwise specified)		
R701	1K	4704-0102-032
R702	4.7K	4704-0472-032
R703	2.2K	4704-0222-032
R704	47K	4704-0473-032
R705	100 ohm	4704-0101-032
R706	10K	4704-0103-032
R707	330 ohm	4704-0331-032
R708	100 ohm	4704-0101-032
R709	1K	4704-0102-032
R710	33K	4704-0333-032
R711	100 ohm	4704-0101-032
R712	100 ohm	4704-0101-032
R713	22K	4704-0223-032
R714	47K	4704-0473-032
R715	100 ohm	4704-0101-032
R716	220 ohm	4704-0221-032
R717	not used	
R718	not used	
R719	470 ohm	4704-0471-032
R720	1K	4704-0102-032

CAPACITORS

C701	10 μ f	1513-0100-002
C702	27pf	1500-0270-605
C703	.1 μ f	1502-0104-006
C704	68pf	1506-0680-500
C705	.1 μ f	1502-0104-006
C706	360pf	1506-0361-550
C707	220pf	1506-0221-550
C708	.1 μ f	1502-0104-006
C709	.1 μ f	1502-0104-006
C710	15pf	1504-0150-550
C711	82pf	1506-0820-550
C712	47 μ f	1513-0470-002
C713	.1 μ f	1502-0104-006
C714	.1 μ f	1502-0104-006
C715	68pf	1506-0680-550

COILS

L701	501-005-18	1800-5100-518
L702	501-005-18	1800-5100-518
L703	501-005-18	1800-5100-518

Reference
Designation

Description

Part Number

TRANSISTORS

Q701	SPS 952-1	4801-0000-013
Q702	2N5447	4801-0000-135
Q703	Blue top	4801-0000-003
Q704	2N5447	4801-0000-135
Q705	Blue top	4801-0000-003

DIODES

CR701	102-412	4805-1241-200
CR702	HSCH-1001	4815-0000-001

JUMPERS

JO701	Red	7011-4102-900
JO702	Coax	7011-4102-800
JO703	Coax	7011-4102-700
JO704	Red	7011-4132-100
JO705	Red	7011-4132-200

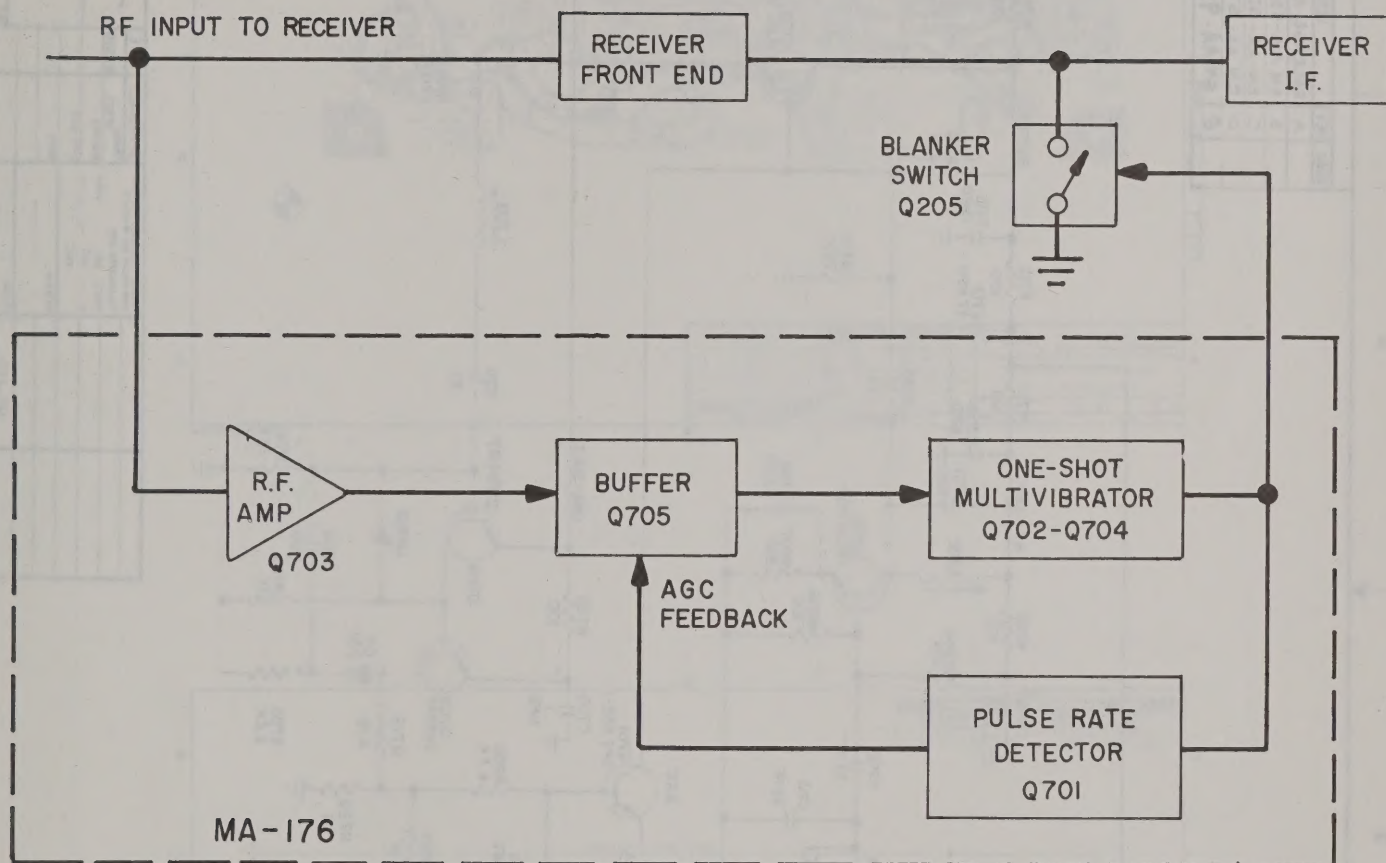
BLOCK DIAGRAM
MA-175 PLANNING SYSTEM

FIG. 1

TABLE 1 NOISE SOURCE

SYMPTOMS AND SUGGESTED REMEDY

NOISE SOURCE	SYMPTOMS IDENTIFIED BY A:	SUGGESTED REMEDY
Ignition	"Popping" sound heard from speaker. Frequency varies with engine speed.	<p>Check condition and adjustment of spark plugs, breaker points and ignition capacitor.</p> <p>Install resistive type spark plugs and ignition harness wires.</p> <p>Bond motor block to the vehicle chassis with flexible cable.</p>
Generator	High Pitch "Whining" sound heard from speaker. Varies with engine speed. Will continue after ignition is off while generator is still turning.	<p>Install a .5μf coaxial capacitor at the generator in series with the armature field.</p>
Voltage Regulator	Raspy or clicking sound	<p>Install a .5μf coaxial capacitor at the battery (B) and the armature (A) terminals of the voltage regulator.</p> <p>Install an RC filter (.001μf cap in series with a 4 ohm resistor) at the Field (F) terminal of the voltage regulator.</p> <p>Check condition of regulator.</p>



BLOCK DIAGRAM
MA-176 BLANKING SYSTEM

FIG. 1

REVISIONS		
ZONE	REV	DESCRIPTION
A	RELEASE R-C86	
B	EN AA-598	dw
C	EN AA-825	CMC 7/1/73
D	EN AA-878	CMC 7/1/73
E	EN AA-913	CMC 10/26/79 RLC

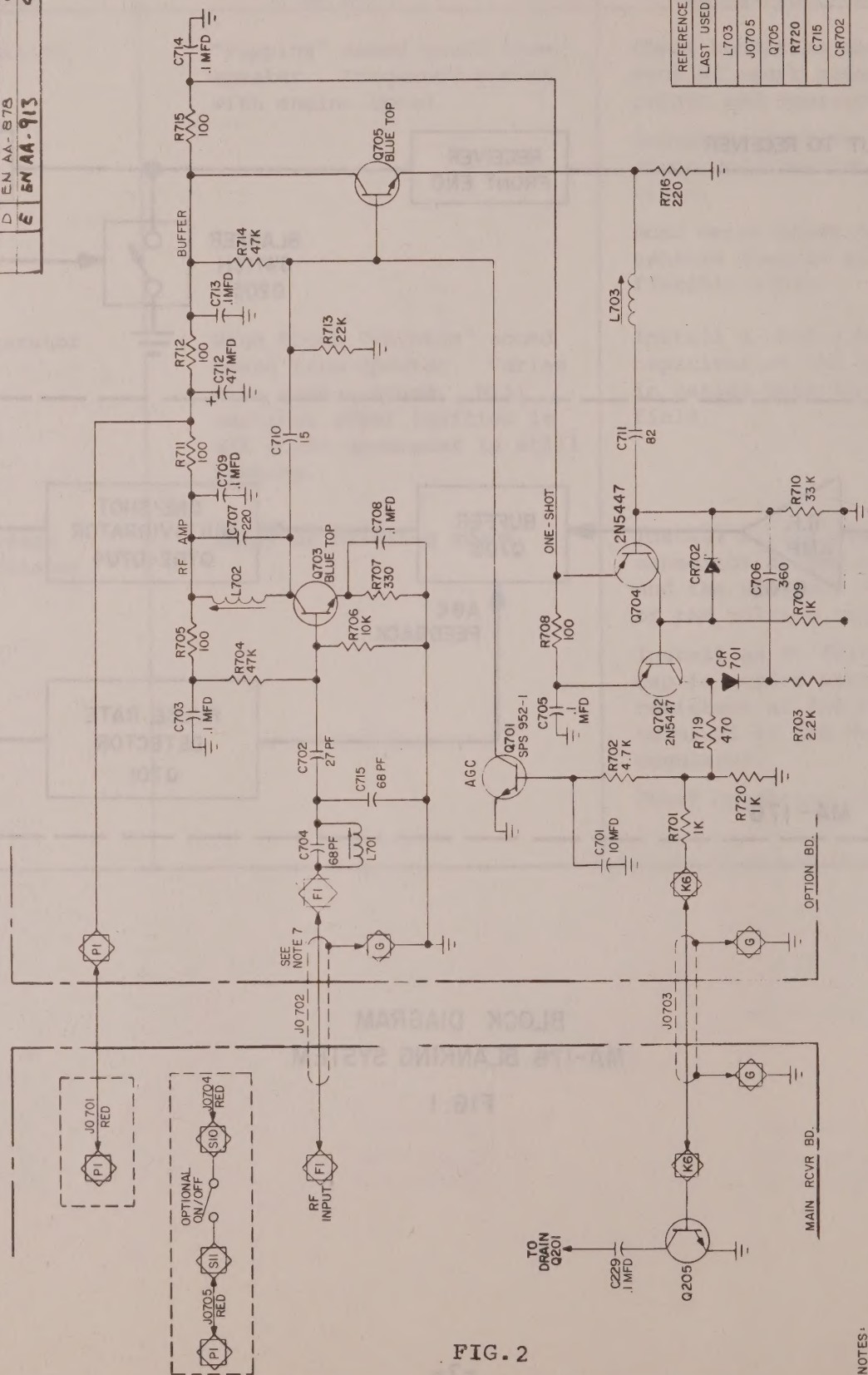


FIG. 2

NOTES:

1. ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARAD.
2. ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS, 1/4 W.
3. DENOTES PIN LOCATED ON P.C. BOARD.
4. DENOTES PLUGGED IN JUMPERS (OPTIONS).
5. --- INDICATES OPTION VARIATIONS
6. --- INDICATES BOARD BOUNDRIES.
7. THIS CABLE IS 30 CM AND GROUNDED ONLY ON BLANKER END.

DWG. NO. 504-166

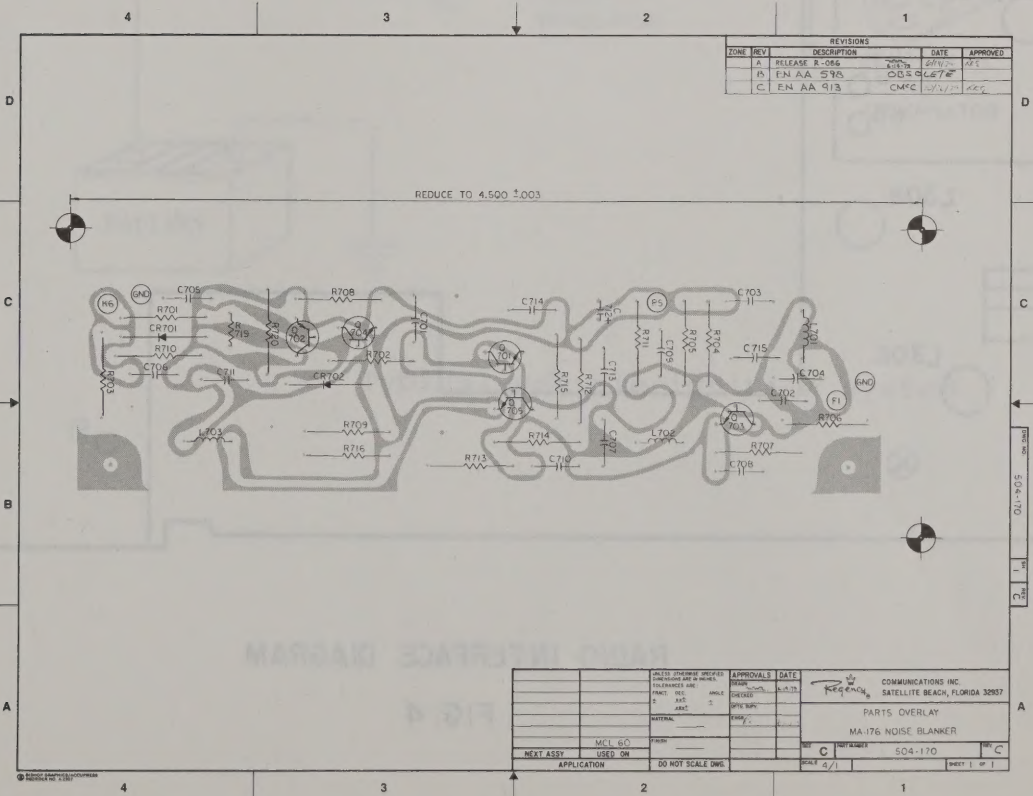
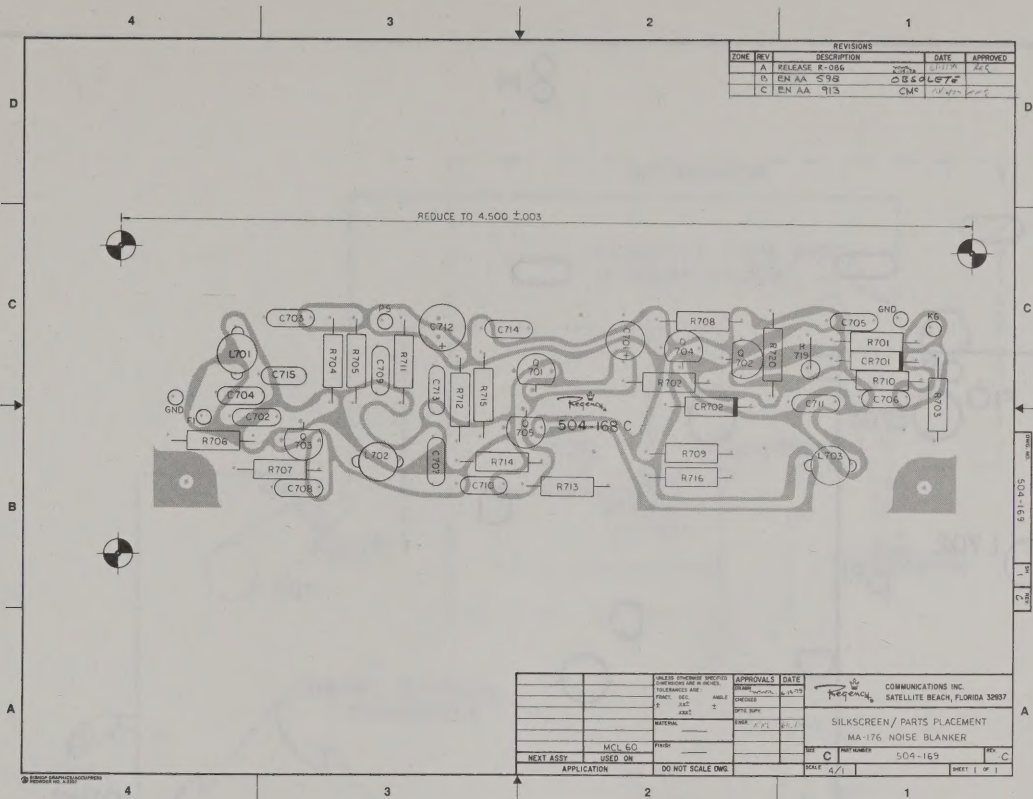
SH 1

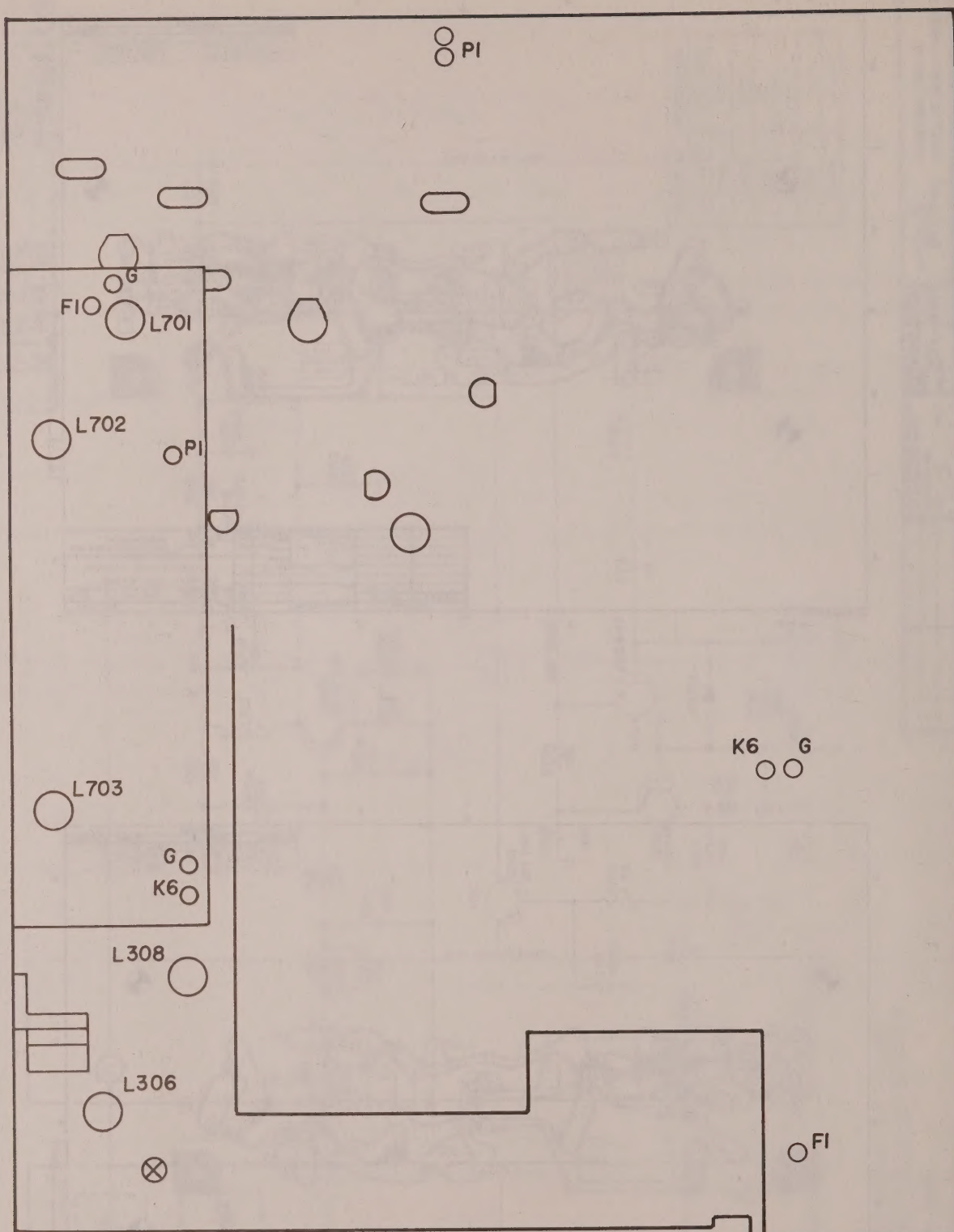
REV E

REFERENCE	DESIGNATIONS
LAST USED	NOT USED
L703	R717
J0705	R718
Q705	
R720	
C715	
CR702	

APPROVALS	DATE
DRAWN BY	8-25-78
CHECKED	
ENGR.	
DO NOT SCALE DWG.	
NEXT ASSY	MA-176
USED ON	
APPLICATION	

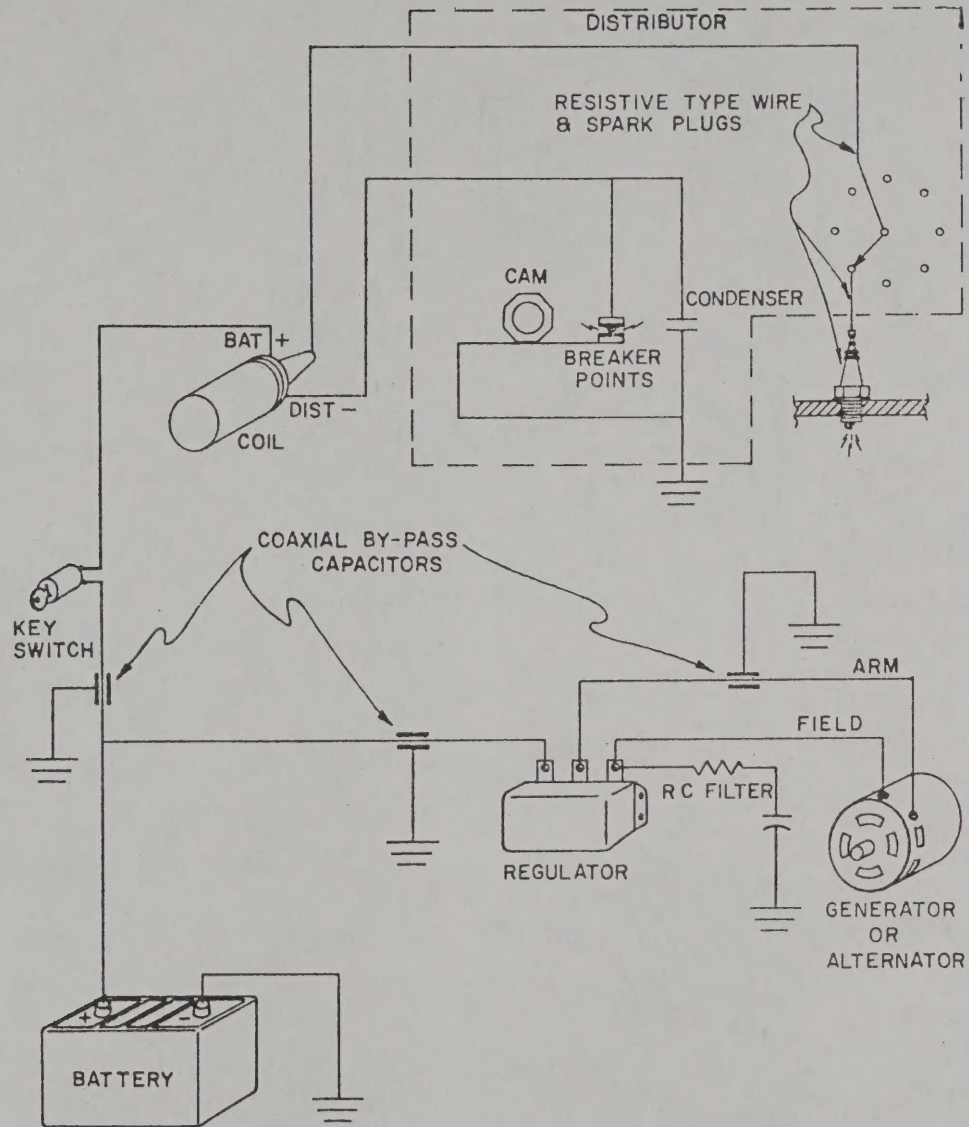
COMMUNICATIONS INC.	MA-176	NOISE BLANKER
SATELLITE BEACH, FLORIDA 32837		
SCHEMATIC		
SIZE	SCALE	SHEET
C	504-166	1 OF 1





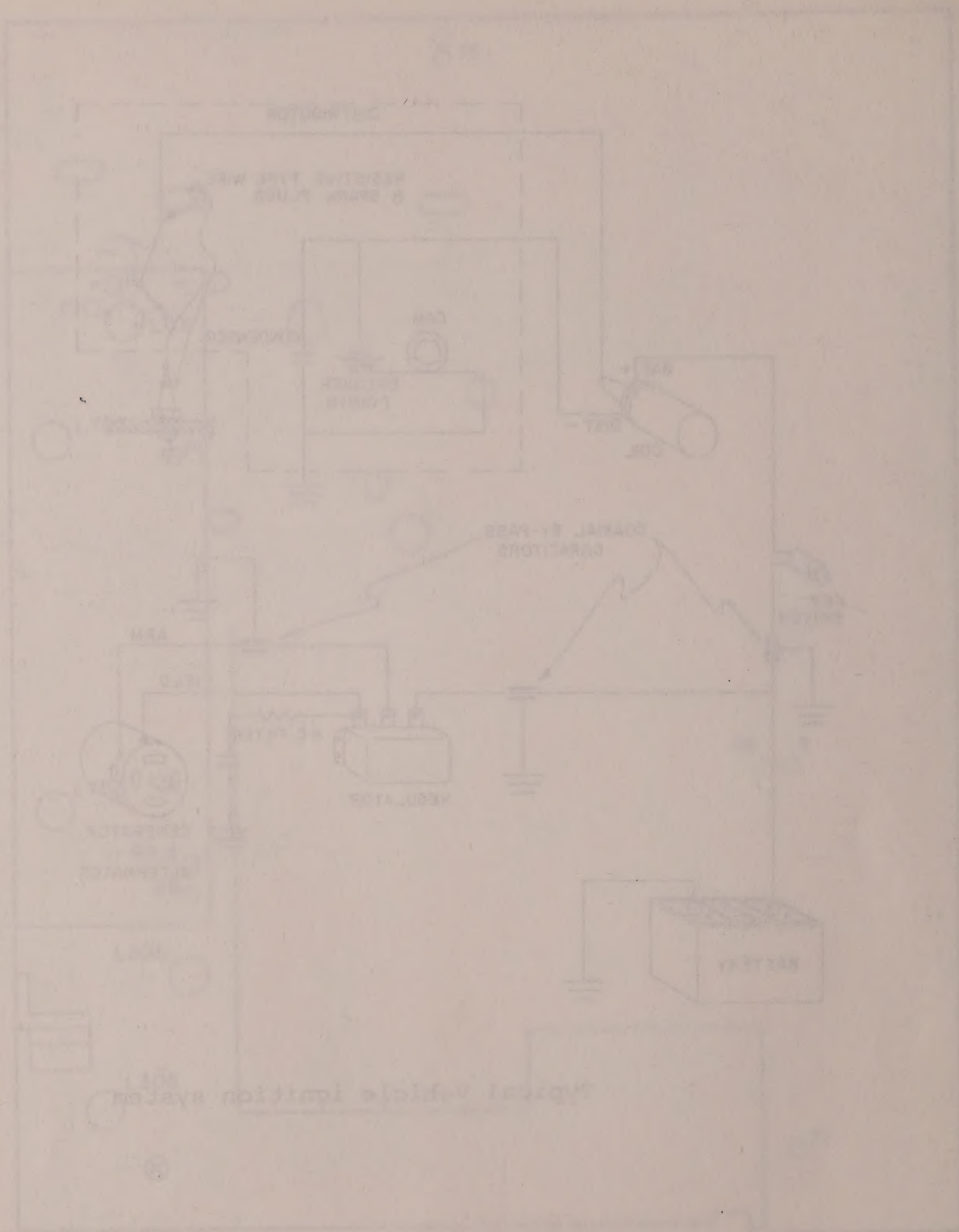
RADIO INTERFACE DIAGRAM

FIG. 4



Typical vehicle ignition system.

FIG.5



WARRANTY EXCLUDED

FIG. 4